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## Publication Title:

### METHOD FOR EMBEDDING LINKS TO A NETWORKED RESOURCE IN A TRANSMISSION MEDIUM

#### Abstract:

A method for providing a link between an information signal (98, 100) (such as a broadcast and cable television and/or radio signals) and networked resources (such as the Internet) comprising the steps of embedding access information in a transmission medium, the access information adapted to provide access to content of the networked resource relevant to content of the information signal, transmitting the information signal and the access information (98, 100), receiving the information signal and the access information at a user terminal, extracting the access information from the transmission medium, utilizing the access information to access the networked resource with an access signal (102, 104), and displaying content of the networked resource on the user terminal corresponding to the access information. Embodiments are provided wherein the information signal (98, 100) is provided by the networked resource provider or a distinct audio/video signal content provider (94) via wired (98) and wireless (100) means.

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<p>(54) Title: METHOD FOR EMBEDDING LINKS TO A NETWORKED RESOURCE IN A TRANSMISSION MEDIUM</p> <p>(57) Abstract</p> <p>A method for providing a link between an information signal (98, 100) (such as a broadcast and cable television and/or radio signals) and networked resources (such as the Internet) comprising the steps of embedding access information in a transmission medium, the access information adapted to provide access to content of the networked resource relevant to content of the information signal, transmitting the information signal and the access information (98, 100), receiving the information signal and the access information at a user terminal, extracting the access information from the transmission medium, utilizing the access information to access the networked resource with an access signal (102, 104), and displaying content of the networked resource on the user terminal corresponding to the access information. Embodiments are provided wherein the information signal (98, 100) is provided by the networked resource provider or a distinct audio/video signal content provider (94) via wired (98) and wireless (100) means.</p>			

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METHOD FOR EMBEDDING LINKS TO A NETWORKED RESOURCE IN A  
TRANSMISSION MEDIUM

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This patent application claims priority of co-pending United States Provisional Application serial no. 60/046,038, which was filed on May 9, 1997 and is hereby incorporated by reference.

10 TECHNICAL FIELD

This invention relates to a method for providing access to networked resources, and in particular to linking the information content of an audio/video information signal to networked resources via under-utilized resources of a transmission medium.

BACKGROUND ART

Networked data sources, such as those found on the Internet, are a rich and important means of information retrieval and distribution and, increasingly, electronic commerce. However, there are problems finding the information desired in this increasingly complex and changing network of data sources. Recently introduced Internet "search engines", such as Yahoo on the World-Wide Web (WWW), help by allowing a user to search networked indices of information sources, and even full source text, for relevant key words and phrases related to their topic of interest, but even carefully structured queries by experienced users often results in hundreds and even thousands of possible "hits" which are not sufficiently specific to preclude further manual search which is both data resource inefficient and time consuming.

Because of these inefficiencies, as well as general lack of familiarity with search engines and their syntax, users sometimes rely on broadcast media to identify source addresses (e.g., Uniform Resource Locators ("URLs")) for web sites and other online information of interest.

However, URL's, are particularly difficult to manually enter in software programs, such as "web browsers", due to their length and use of complex and unfamiliar symbols. If the characters in an address are not entered exactly, retrieval is prevented or, in a limited number of cases, a legal but incorrect source is accessed. This is especially true when URLs incorporate foreign languages and/or complex query instructions to networked databases, as is increasingly frequent in most web sites. In addition, the inability to type or otherwise manually enter symbolic address information due to either disability or lack of training complicates use of networked information resources such as the Internet for millions of individuals.

It is widely anticipated that Internet access will increasingly be provided through interactive cable television via web-ready television receivers and set-top boxes used in conjunction with conventional television receivers. The so-called web-ready television is a television that can receive and display conventional broadcast television signals, which has means for allowing a user to access the WWW by providing a modem and appropriately programmed microprocessor based control circuitry. A software module such as a web browser is used to allow the user to dial-up an Internet service provider (ISP) and request files from host servers on the Internet. The downloaded Web pages may be displayed via the browser on

a portion of the TV screen (i.e. via picture-in-picture (PIP)). Thus, the user can both watch TV and "surf the Web", as independent functions, with one piece of equipment. A set-top converter is used in conjunction with a conventional TV to accomplish the same effect; for example, SONY markets such a device as a "WebTV" product.

In this home entertainment environment, it is difficult to use keyboards for URL address entry in the Web browser due to both lack of typing skill and the cumbersome placement of these components. Therefore, a method which would eliminate typing and allow users to directly link broadcast media options to electronic information sources by choosing amongst a number of relevant URL's provided by the broadcaster would be highly desirable.

A problem arises during the broadcast of URL's or other links to networked resources within standard broadcast media in that the duration of time in which the link can be displayed is limited to typically 5-10 seconds. Such a short duration does not provide enough time for the viewing audience to copy anything other than the name of the server. This forces advertisers and other content providers to either direct viewers to generic home pages, or to create additional domain names for specific products, which becomes both expensive and time consuming due to the necessity and procedures associated with registration of domain names.

Therefore, it would be advantageous if links to networked resources such as URL's could be displayed to viewers for a sufficient amount of time to enable them to either copy the entire link or access the link via automatic or selective means.

Applications for a direct and efficient link between broadcast media and networked resources are potentially limitless with the following representing only a small sample:

1. sporting events with simultaneous access to networked player statistics, commercial sale of team related goods, books, video recordings of the game, and advance ticket sales;

2. travel shows with simultaneous access to networked details regarding the region discussed, commercial sale of travel arrangements, maps, books, guides, suitable clothing, and luggage;

6. soap operas with simultaneous access to networked prior episodes in summary or detail, background of characters and actors playing each character, contact information regarding fan clubs;

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7. game shows with simultaneous option to participate in a networked version of the same game being conducted in parallel with broadcast version;

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8. nature shows with simultaneous option to contribute to wildlife/restoration funds using secure electronic currency, and information regarding conservation of and travel to the regions being filmed;

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9. movies with the simultaneous ability to purchase relevant books and videos, participate in trivia quizzes, access information regarding special appearances of actors and fan clubs;

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10. talk shows with simultaneous ability to reply to and participate in discussions with the audience;

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In addition schedule information, and less expensive commercials, which would otherwise occupy costly broadcast time could be relocated to networked resources. Therefore, there is a need for an efficient link between audio and video based media and networked resources which is user friendly to the majority of television users in order to satisfy both commercial and informational enterprises.

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Information comprising audio and/or video content such as that found in radio broadcasts, television broadcasts, audio and video tapes, audio/video and

interactive compact discs (CD's), and audio and video signals transceived via cable and satellite are often closely related to a wide variety of networked resources. Multiplexed audio such as multiple language simulcasting (MTS) provides yet another means by which a provider may gain valuable information about potential users with which the provider can then tailor those choices of networked resources made available to the user. Such a relationship may be in the form of commercial sales of relevant merchandise, additional sources of complementary information, and a host of networked resources designed to interest a potential listener to the particular audio content.

Therefore, there is a distinct need for a link between media comprising audio content information and pertinent networked resources.

One of the problems faced by providers of networked resources is that they receive little if any feedback from those that access their site. Information which would be useful to a provider includes both demographic data regarding the user as well as viewing and listening data which details the programs watched or listened to, and the time, date and duration (i.e., temporal information) for which this is done.

Therefore, it would be advantageous to provide a means whereby the networked provider could access feedback information comprising user demographics and viewing and listening data either in real-time or subsequent to the broadcast directly or through an intermediary (e.g. clearing house). It would also be extremely advantageous if such

information could be cross-correlated to achieve "Nielsen Ratings" type information.

International Application No. WO 97/38529, submitted under the Patent Cooperation Treaty and hereby incorporated by reference, discloses an interactive system and method for accessing an information source such as the Internet through an existing cable television distribution system and headend distribution equipment in conjunction with a plurality of televisions with settop converters. The user inputs an upstream command intended for the information source via a remote control unit or keyboard. The information source responds by providing display information to the headend distribution equipment, which is then inserted into blank intervals such as the vertical or horizontal blanking intervals of the television transmission on a downstream channel by the headend distribution equipment. The display information represents sequential picture data, which is extracted by the settop converter and displayed to the user on the television. Thus, this reference discloses a relatively complex method of two-way communication between a user and an information source, which provides the user with access to such services as the Internet. However, this method requires that the protocol used to transmit user commands upstream and display information downstream include addressing information that identifies the specific user issuing the command and receiving the display information. In addition, since the sole connection to the information source is via the headend distribution equipment, complete display information must be transmitted back to the user which is generally continuous and rather lengthy.

Therefore, it would be advantageous to provide a simple and efficient means of linking audio/video information with relevant content from an information source such as that found on the Internet without requiring the inclusion of addressing information which identifies the particular user requesting access to the information source. In addition, it would be advantageous if access information enabling the user to link to the information source would not be required to include complete display information which induce delays in the response time perceived by the user to his requests for access. In addition, it would be advantageous if such a system could be adapted for use in broadcast television and/or radio.

Another system very similar to that disclosed in the '38529 application is described on the Internet (<http://connectedpc.com/lawweb/intercast/whatis/info01.htm>) and called Intercast™ Technology. However, this system uses a personal computer with a video capture card which enables the personal computer to receive and display cable television signals. Web pages which may contain hyperlinks to additional web pages are embedded within the vertical blanking interval of the cable television signal. The personal computer displays a composite picture including the cable television signal, the web page, a list of downloaded web pages, a television channel selection area and a web page selection area. While a particular television channel is displayed the user can select one of a number of related web pages for display in the web page area of the screen as well as selecting another television channel and corresponding related web pages. Unlike the system disclosed in the '38529 patent, this technology requires that the user have a separate connection to the Internet.

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However, like the '38539 patent this technology discloses the transmission of complete web pages for display to the user, which adds a significant amount of information to be transmitted within the limited resources of the vertical blanking interval.

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Therefore, it would be advantageous if a system could provide access to networked resources to the user by only sending a minimal amount of information to link the user to the networked resource.

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In accordance with the present invention, a method for providing a link between an information signal and networked resources is provided comprising the steps of embedding access information in a transmission medium, the access information adapted to provide access to content of a networked resource relevant to content of the information signal, transmitting the information signal and the access information, receiving the information signal and the access information at a user terminal, extracting the access information from the transmission medium, utilizing the access information to access the networked resource with an access signal, and displaying content of the networked resource on the user terminal corresponding to the access information. The step of embedding the access information may further comprise the step of embedding the access information within a vertical or horizontal blanking interval of the information signal, bandwidth not used by the information signal, a sideband of the information signal, a header of an internet message packet and/or a subcarrier in the transmission medium.

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In further accordance with the present invention, the step of embedding the access information may further comprise the step of overlaying the access information with the information signal, the step of transmitting may further comprise the step of transmitting the information signal and access information using spread spectrum transmission techniques, and the step of receiving may further comprise the step of receiving the information signal and access information using spread spectrum reception techniques. The step of embedding the access information may further comprise the steps of embedding the access information within a channel comprising access information corresponding to a plurality of information signals, and extracting access information from the channel corresponding to the information signal currently being received. The access information may be synchronized to a predetermined portion of the information signal.

In still further accordance with the present invention, the information signal may comprise audio and/or video content. The step of displaying the content of the networked resource may further comprise the step of displaying the transmitted networked resource in a picture in a picture (PIP) on the user terminal, and/or the step of displaying indicia indicating availability of the link to the content of the networked resource and displaying the transmitted networked resource to the user in response to selection of the indicia.

In accordance with the present invention, the method for providing a link between an information signal and networked resources may further comprise the steps of compressing the access information prior to embedding the

access information in the transmission medium, decompressing the access information by the user terminal, encoding the access information prior to embedding the access information in the transmission medium, decoding the access information by the user terminal, embedding the user information into the access signal, compressing the user information prior to embedding the access information into the access signal, encrypting the user information prior to embedding the access information into the access signal, embedding access information to additional networked resources in the content of the networked resource, encoding the access information to additional networked resources prior to embedding the access information to additional networked resources in the content of the networked resource, and compressing the access information to additional networked resources prior to embedding the access information to additional networked resources in the content of the networked resource.

In further accordance with the present invention, the method for providing a link between an information signal and networked resources may further comprise the steps of assigning an index corresponding to each of a plurality of networked resources, selecting one of the indices corresponding to the plurality of networked resources, utilizing the index to determine which of the plurality of networked resources to access, and providing a summarized content for the index, the summarized content representative of the content of the corresponding networked resource.

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In still further accordance with the present invention, the step of embedding the access information may further comprise the step of embedding a link to the

networked resource in the transmission medium, or embedding a URL in the transmission medium, and recording the user information and optional temporal information by the networked resource. The step of displaying content may further comprise the step of automatically displaying the content without user intervention, or selectively displaying the content in response to user intervention.

In accordance with the present invention, the user terminal may be a portable personal computer, personal computer or television, adapted for reception of television signals and/or radio signals, access to the Internet and wireless access to the networked resources. The transmission medium may be free space, a wire, or the Internet. The step of embedding access information may further comprise the step of utilizing user information to determine access to content of the networked resource. The step of utilizing the access information may further comprise the step of transmitting user information to the networked resource.

#### BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and features of the invention shall now be described in relation to the drawings.

Fig. 1 illustrates one embodiment of an apparatus providing user access to embedded links within an audio/video signal to networked resources of the present invention.

Fig. 2 is a flowchart illustrating a method for providing an automatic link between the audio/video signal and networked resources of the present invention.

5 Fig. 3 is a flowchart illustrating a method for providing a plurality of selectable links between the audio/video signal and a plurality of networked resources of the present invention.

10 Fig. 4 illustrates a relational flowchart illustrating the tasks to be performed by an audio/video signal provider, the networked resource provider and the user.

15 Fig. 5 illustrates the concept of interlaced scanning of the prior art.

20 Fig. 6 illustrates an apparatus for providing both automatic and user selectable links between the audio/video signal and networked resources of the present invention.

Fig. 6A illustrates the spectral components of an NTSC signal of the prior art.

25 Fig. 7 illustrates a top level block diagram of a first embodiment of the apparatus for providing both automatic and user selectable links between the audio/video signal and networked resources of the present invention wherein the audio video signal is made available to the user by an entity separate from the networked resource provider.

30 Fig. 8 illustrates a top level block diagram of a second embodiment of the apparatus for providing both

automatic and user selectable links between the audio/video signal and networked resources of the present invention wherein the audio video signal is made available to the user by the networked resource provider.

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BEST MODE FOR CARRYING OUT THE INVENTION

Fig.1 illustrates one embodiment of an apparatus 10 which is adapted to provide access to embedded links between audio/video signals such as broadcast and cable 10 television and radio signals and networked resources such as the Internet, local databases, remote databases, and other depositaries of information well known in the art. In the example illustrated, a baseball game is displayed in a primary viewing area 12 of a web-ready television 14. The web-ready television 14 could equivalently be a standard television receiver, cable decoder box, web television transceiver (which comprises a set top plug-in card incorporating television receiver components and Internet access functionality), VCR's or a digital disk (e.g. DVDI) 15 while still being within the scope of the present invention. 20

A user (not shown) is given a choice of networked resources 16 relevant to the baseball game superimposed on the primary viewing area 12 (e.g., such as statistics of the current player, team schedule, and options to purchase team 25 related products) in the lower left corner. The user may access any of the networked or on-line resources 16 by depressing one of a set of buttons on a remote control unit 18 corresponding to an indexing scheme which references the on-screen selection of networked resources 16. In the 30 example illustrated in Fig. 1, a dedicated button (i.e., 1, 2, 3) is provided for each of the networked resources 16 while in practice this could be accomplished by depression

of the same button in rapid succession or other means well known to those skilled in the art. Depression of the button or buttons on the remote control unit 18 initiates a transmission of an infrared signal from the remote control 5 unit 18 to the web-ready television 14 by means well known in the art. Upon receipt and decoding of the infrared signal a web browser within the web-ready television 14 will use decoded information to gain access to a specific site or sites on the networked resource or Internet. Access to the 10 networked resources 16 is then be displayed in a picture in a picture (PIP) 20, an auxiliary display or equivalent means by methods well known in the art.

Access to the networked resources 16 could also be 15 provided via a logo or other indicia, for instance, overlayed in the corner of the television screen. The logo could read "Active Content Available" or an equivalent phrase indicating that the link was available for accessing the networked resource without displaying the actual 20 content. The content of the networked resource could then be displayed in response to selection of the logo by the viewer either in a PIP or in full-screen mode. If a similar logo were provided in the display of the networked resource in full-screen mode then the viewer could toggle between 25 displaying the networked resource and displaying the audio/video signal.

As the content of the audio/video signal changes so might the choice of networked resources 16 offered to the 30 user in order to maintain synchronization and relevancy between the networked resources provided to the user and the information content of the audio/video signal. The synchronized choice of networked resources could be adapted

for dialogue between the information content of the audio/video signal and the selection indicia for a particular networked resource. For example, the user could be given the choice of purchasing the same dress worn by an actress simultaneously appearing on the television screen, or a list of current appearances for a singer simultaneously performing on a radio station.

Similarly, Fig. 2 illustrates a method of the present invention which provides an automatic link between the audio/video signal and networked or on-line resources. A decision is made by the audio/video signal provider as to which networked resources are to be linked to a particular signal and the synchronization and duration of each choice. For example, the producer of a television show may have knowledge of a plurality of Web sites relevant to the content of the program which he may synchronize to particular segments of the audio/video signal. Access information (typically a URL) pertinent to the chosen networked resources is chosen by the provider and optionally encoded 32 prior to being embedded 34 within the audio/video signal. In the audio/video signal provider may use information such as user demographics, viewing and listening data, and data which has been analyzed off-line in order to determine the suitability of networked resources to be offered to the user. Such data may be obtained from the user or third party sources (e.g., clearing houses) via both in-band and out-band 32A techniques (e.g., via cable, modem, satellite, sideband RF, paging channels, etc.). A particularly useful application of this information would be in obtaining "Neilson Rating" type information which monitors the programs watched and listened to by a large cross-section of users whose demographic information is

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known and available for cross-correlation. This information could then be used by potential advertisers in determining market shares, efficacy of particular timeslots, and real-time response to a multitude of programming and advertising content.

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Compression of the encoded information 33 may be advisable due to the quantity of useful data which can be appended to the networked resource access information and the limits imposed by the method used to insert this information into the transmission medium. A method of compression described in a co-pending United States Provisional Patent Application Serial Nos. 60/037,988 and 09/023,918 which are hereby incorporated by reference, may be utilized in the present invention. Briefly, the method encodes a network address of the target server computer and a target file index pointer as opposed to a more lengthy URL address in providing access information which points to specific networked resources. Alternative methods of compression could be used which are well known in the art.

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The optionally compressed information is embedded 34 during a horizontal and/or vertical blanking interval of the audio/video signal (such as a broadcast or cable television or radio signal) since it is here that there exists a residue of unused resources or bandwidth. U.S. Pat. No. 5,497,187 discloses such a method for insertion of information in the vertical blanking interval of television signals, which is hereby incorporated by reference. Such information could also be encoded in sidebands, subcarriers or alternative means that utilize unused resources for transferring additional information in audio and/or video signals well known to those skilled in the art. U.S. Pat.

Nos. 5,621,471 and 5,657,088 disclose methods of embedding and recovering additional information within a video signal, which are hereby incorporated by reference.

Following receipt 42D of the networked resource access information and optional user demographics and viewing/listening data, the provider may encode 42E

additional networked resource access information utilizing user demographics, and viewing/listening data, compress 42F the encoded information, and embed 42G the compressed information 42G onto the signal providing the user with the designated networked resource. In this way, nesting of accesses to networked resources may be accomplished via under-utilized resources of the transmission medium guided both by the user's prior choice of networked resources as well as user demographics and viewing/listening data. The desired networked resource is transmitted 44 to the user who then receives and displays 46 the networked resource. The user may receive access to the networked resources via a number of techniques including conventional modem, cable modem, satellite, sideband RF, and paging channels.

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A modification of the above method is provided in Fig. 3 which illustrates a method of the present invention that provides a user selectable link between an audio/video signal and a plurality of networked resources 30A wherein the user is provided a choice of different networked resources to access as shown in Figure 1. This differs from the automatic system of Figure 2 in that the networked resource is not automatically accessed. A decision is made by the audio/video signal provider as to which of the plurality of networked resources will be made available to the user during a specified duration of the audio/video signal using optional additional sources of information such as user demographics, viewing/listening data and data which has been analyzed off-line and obtained via in-band or out-band techniques 32AA. The access information pertinent to the plurality of networked resources chosen is then encoded 32A prior to being embedded 34A within the audio/video signal. Just as in the embodiment illustrated in Fig. 2,

this information may be embedded 34A during a horizontal and/or blanking interval of the audio/video signal, within the sidebands or subcarriers of the signal or alternative methods utilizing unused resources for the transfer of 5 additional information in audio and/or video signals well known in the art. The resulting signal is processed using substantially the same steps as in the automatic method illustrated in Fig.2, with the exception that following decoding 42AA of the access information, descriptive 10 information or summarized contents of each choice of networked resources available is provided to the user 42AB with indicia corresponding to each choice of networked resource. The user selects 42AC a particular index and transmits 42AD that index. The index is received 42AE and 15 the corresponding networked resource is transmitted 44A using the decoded access information previously extracted from the audio/video signal. The networked resource can optionally record the user demographics, index, viewing/listening data as well as temporal information such 20 as the data and time for future use, resale and/or analysis. The networked resource is then displayed 46A to the user. Alternatively, following selection of the index 42AC the 25 user's hardware and/or software may encrypt 42AF the index along with user demographics and viewing/listening data and optionally compress 42AG the encrypted information in order to enable the provider to gain access to further information useful in determining potential additional choices of networked resources to offer the user. The additional choices of networked resources may optionally be encoded 30 42AH, compressed 42AI and embedded 42AJ onto the audio/video signal comprising access to the networked resource originally chosen by the user prior to being transmitted 44A by the provider and displayed 46A to the user.

5                   The steps illustrated in the method of Fig. 3 are listed under the corresponding entity that performs them in Fig. 4. Optional steps are included in Fig. 4 in the order most likely performed, however, this is not intended as a limitation in that the steps may be performed in a number of different sequences within the scope of the present invention.

10                  The following represents a summary of color television technology provided in order to enhance understanding of the block diagram of an apparatus that performs the present invention which follows. While the following summary primarily describes the functionality of 15 television reception with respect to National Television Systems Committee (NTSC) standards, the present invention is also intended to be applicable to alternative standards comprising Sequential Color with AVEC Memory (SECAM), Phase Alteration each Line (PAL) and the various forms of High 20 Definition Television (HDTV) as well. Each of the aforementioned standards are described in detail in K. Benson, The Television Engineering Handbook chapters 21, 23-24 (1992), which is hereby incorporated by reference.

25                  Electronic transmission and reception of visual images in the form of video signals is, like motion pictures, based upon the phenomenon that a series of successive images is seen as a continuous picture due to the persistence of human vision. Through the use of interlaced 30 scanning 30 images can be broadcast per second without providing noticeable flicker. A television transmitter samples segments of the image for brightness with respect to three colors (red, green and blue) and transmits the sampled

information in sequence. The image is scanned by an electron beam just as an Optical Character Recognition (OCR) reader scans a page of printed type--character by character and line by line. This results in the flow of an electric current with an instantaneous magnitude proportional to the brightness of the segment scanned. A television receiver reproduces each segment of the image transmitted from the broadcast video with its proper position, brightness and color. An electron beam in the picture tube of the receiver is modulated in intensity by the incoming video signal as the beam scans the picture tube in synchronism with the scanner of the transmitter. The light is emitted from the photoelectric surface of the picture tube on the viewable side of the picture tube in proportion to the intensity of the electron beam which strikes it. Therefore, the original image scanned is reproduced having its original position, brightness and color.

An image is transduced by scanning it according to a fine structure of parallel nearly horizontal lines called *scanning rasters*. The complete raster is rectangular in shape. Scanning may be done conventionally by starting at the upper left-hand corner along the first line and moving toward the right at constant speed. At the end of the first line a quick return is made to the left-hand side to start the scanning of the second line, again moving towards the right. When all lines have been scanned in this way, from top to bottom, the process is repeated by returning quickly to the upper left-hand corner where the first line is located. If all the lines are scanned in the sequence described above, the process is called *sequential scanning*.

In accordance with standards in the United States (NTSC), each frame comprises 525 scan or raster lines which in turn comprise several hundred picture elements. Each line is scanned and transmitted to the receiver which 5 enables 30 frames to be received per second. At the end of each line the pickup tube output of the transmitter is blanked during which time the scanning beam is redirected to the next line. This time is commonly referred to as 10 *horizontal blanking* and is used to transmit synchronizing signals which synchronize the scanning process at the receiver to that of the transmitter. Similarly, after completion of the last line of the frame the picture is blanked during that time the electron beam is retraced to the first line of the image, typically referred to as 15 *vertical blanking*. If the output of the electron beam were not suppressed or blanked during the horizontal and vertical blanking intervals there would be objectionable lines on the received image tracing the movement of the electron beam as it retraces. Charge coupled imaging devices do not require 20 complex deflection or blanking circuits since they are scanned by using address accessing and retrieval techniques. Pulse counters, divider chains and memory provide the correct sequential readout of the charge coupled device array so that an image is recovered from the individual 25 outputs of the photodiodes from the charge coupled device without the need to compensate for the retracing of the electron beam.

A process referred to as *interlaced scanning* 30 represents a variation of sequential scanning and is used to conserve bandwidth in the transmission system without introducing noticeable flicker. Flicker is a function of the raster coverage repetition rate as well as duty cycle,

luminance and the decay characteristic of the picture tube. With interlaced scanning, alternate (odd) lines, shown as dashed lines in Fig. 5, are scanned first and the remaining (even) lines, shown as solid lines in Fig. 5, are scanned next. The entire raster area is covered or scanned twice. Therefore, the repetition rate for interlaced scanning is twice that of sequential scanning, which is at the same velocity along each line, which results in a corresponding reduction in flicker. The entire raster is covered 30 times per second, thereby permitting the frame to be scanned 60 times per second.

Interlaced scanning is illustrated in Fig. 5. The number of raster lines pictured is intended for illustration only and not intended to represent the actual number used in practice. The first raster line 60 begins at the top center of the image. The beam then proceeds for a half line to the right edge. Horizontal retracing (horizontal blanking) to the left occurs, and the third line follows 62. At the right end of the third line, one and a half lines have been scanned. The fifth line 64 and successive odd-numbered lines are scanned for a total of 241.5 lines, ending at the lower right corner. Twenty-one lines elapse during the vertical retrace interval (vertical blanking) during which the scanning beam is moved to the upper left corner, placing it in position to start scanning the second line. This completes one full field. Then 241.5 successive even lines are scanned, ending at the middle bottom of the image. Again 21 lines elapse for vertical retrace (vertical blanking), during which time the scanning beam is returned to the top center of the image. This completes the second field and thus a full frame 66. The sequence then repeats.

According to standards in the United States 15,750 lines are required to be scanned per second. With a vertical scanning rate of 30 times per second, there are 525 lines allocated to each frame and 262.5 lines per field.

5 Each line has a duration of 63.49 microseconds. A finite period of time is required to return the scanning electron beam to the left edge of the image for the next line. This horizontal blanking period requires 16-18% of the total line time, or 10.16-11.43 microseconds. Similarly, 7.5-8% of the

10 vertical blanking period, or 1250-1333 microseconds, is required in vertical blanking to enable the scanning beam to return to the top of the picture. This is the equivalent of about 21 scanning lines. Blanking circuits prevent the transmission of brightness variations during both the

15 horizontal and vertical retrace intervals.

Fig. 6 illustrates an apparatus for linking to networked resources embedded within broadcast or cable television signals 70 of the present invention. National Television System Committee (NTSC) and other broadcast television transmission standards comprise additional bandwidth at the end of each field (in the case of interlaced scanning described above) and frame which is used to reduce screen distortion in receivers with aged or intolerant components. This additional bandwidth is also used to transmit video frame relevant information, generally by means of an error corrected transmission protocol (such as the North American Broadcast Teletext Standard (NABTS)) for subsequent retrieval and use in broadcast enhancing functions, such as data for closed captioning systems. The present invention seeks to embed access information to networked resources within an audio/video signal making it possible for devices such as web-ready television, set-top

conversion units, cable decoder boxes, WebTV transceivers, VCR's, and digital disks (particularly DVDI) to link to networked resources such as the World Wide Web and access other networked sites relevant to the information content in the audio/video signal.

5 The block diagram of a color television receiver 72, illustrated in Fig. 6, receives a video signal from an antenna 74 or cable. The signal could equivalently be provided via conventional modem, cable modem, satellite, 10 sideband RF, paging channels or other equivalent means well known in the art. The video signal is encoded with access information corresponding to networked resources during the vertical blanking and/or horizontal blanking intervals or equivalent means well known in the art as discussed above. 15 It is anticipated that the audio/video signal provider will have made the decision as to which access information will be encoded onto the video signal prior to transmission and that such decisions will be dynamically updated in order to 20 retain synchronization between the choice of networked resources provided to the user and the particular information content of the signal presented to the user. It is also anticipated that the user may optionally be given a choice of networked resources during various segments of the 25 signal.

Subsequent to the video signal being input and applied to a video detector 76 of the television receiver 72, the networked resource access information encoded in the 30 vertical and/or horizontal blanking intervals, sidebands, subcarrier or alternative means well known in the art will be separated from the detected video signal via a networked resource access information separator 78 by means well known

in the art. The networked resource access information is then provided to either a web-ready television, set-top conversion unit, cable decoder box, VCR or equivalent system well known in the art 80. The networked resource access information is also provided to a color cathode ray tube display 82 in order to display (e.g., by superimposing on the primary image, on the full-screen, or in a Picture within a Picture (PIP)) the potential options of networked resources to enable the user to choose amongst them as also shown in Fig. 1. The networked resource access information provided to the color cathode ray tube display 82 may be provided in terms of descriptive summaries of the content of each networked resource option coupled with an index in order to enable the user to input his choice via the remote control unit 18 or other equivalent entry devices (e.g., keyboard) well known in the art. The networked resource access information provided to the video display device 80 typically represents a set of addresses (such as URL's) pointing to networked resources chosen by the audio/video signal provider that correspond to the options provided to the user. In the case of the Internet being the networked resource, a web browser 84 then accesses one of the addresses specified by the user through a network interface 86 and provides the user with a display of the networked resource on either the video display device 80, an auxiliary display (not shown), the full-screen of the display, or a (PIP) on the color cathode ray tube 82.

An additional embodiment is possible using the concepts illustrated in Fig. 6 and the method illustrated in Fig. 2, wherein the user is not provided a choice of networked resources but rather a particular networked resource is accessed automatically upon receipt by the web

5 browser 84 of the extracted networked resource access information. The remote control 18 would either be non-essential or its input ignored in this embodiment while the controller 88 would be required to proceed with networked accesses automatically without intervention by the user via the remote control unit 18.

10 As described above, the link or access information to the networked resource could also be embedded within an unused sideband or subcarrier of the audio/video signal. Each television signal consists of a video signal and an audio signal. The NTSC prescribed signal has a bandwidth of approximately 6.00MHz and is modulated onto a predefined carrier frequency according to the channel to be transmitted on. For instance VHF channel four has channel limits between 61-68Mhz, a video carrier frequency of 62.25MHz and an audio carrier frequency of 67.75MHz. The area between channels reduces interference between channels.

15 20 25 30 The frequency spectrum of the NTSC signal is illustrated in Fig. 6A. The video signal consists of a luminance signal 108 and a chrominance signal 110. The luminance signal 108 provides the signal intensity for both black-and-white and color television signals. The luminance signal 108 has spectral peaks 112 every 15.75kHz, which correspond to the horizontal frequency in the television. The amplitude of the luminance spectral peaks 112 decreases up to 4.2MHz. The video signal is suppressed above 4.20MHz to provide for the audio signal 114, which is modulated with a 4.50MHz carrier. The chrominance signal 110 starts at approximately 2.08MHz in the spectrum and is modulated at a frequency of 3.58MHz. The chrominance signal 110 has spectral peaks 116 , which are also spaced 15.75kHz apart.

A detailed discussion of these and related concepts is provided in K. Benson, The Television Engineering (1992), which is hereby incorporated by reference.

5                   The access information of the present invention could be modulated on a subcarrier between 4.20MHz and 4.50MHz, or between 4.50MHz and the upper limit of the bandwidth, which is approximately 6.00MHz, by means well known in the art. Likewise, a subcarrier could be used to provide access information for AM and FM radio broadcast signals by means well known in the art. In addition, since during the modulation of NTSC signals onto the broadcast carrier, one sideband of the modulated signal is filtered out to reduce bandwidth requirements, the unused bandwidth could be used to transmit access information by means well known in the art.

20                  In order to provide an understanding of the Internet and on-line resource concepts used in the present invention a brief discussion of the relevant technology will be provided. The World Wide Web is a distributed hypermedia repository of information that is accessed with an interactive browser. A browser displays a page of information and allows the user to move to another page by 25 making a selection using a pointing device such as a mouse.

30                  Web documents are written in the Hyper-Text Markup Language (HTML). In addition to text, a document contains tags that specify document layout and formatting. Some tags cause an immediate change, while others are used in pairs to apply an action to multiple items. Because an HTML document uses a textual representation, images are not included directly in a document. Instead, a tag is placed in the

document to specify the place at which an image should be inserted and the source of the image.

5                   The anchor tag is used to specify those items in an HTML document which correspond to an external reference. When a browser displays the document, the browser marks the reference to obtain a new document. Because an anchor can include arbitrary items, a selection can correspond to a picture or an icon as easily as to text.

10                  External references are given in the form of a Universal Resource Locator (URL). A browser extracts from the URL the protocol used to access the item, the name of the computer on which the item resides, and the name of the item. A URL that begins with *http://* specifies that a browser should use the Hyper-Text Transport Protocol (HTTP) to access the item; a browser can also use other services such as File Transfer Protocol (FTP).

20                  Although HTML includes many features used to describe the contents and format of a document, the feature that distinguishes HTML from conventional document formatting languages is its ability to include hypertext references. Each hypertext reference is a passive pointer to another document. Unlike providing the URL directly to the browser, as performed by the present invention, the technique used by Intercast™ technology to include hypertext references does not cause an immediate action. Instead, a browser turns the hypertext reference into a selectable item when displaying the document. If the user selects the item, the browser follows the reference, retrieves the document to which it refers, and replaces the current display with the new document.

HTML allows any item to be designated as a hypertext reference. Thus, a single word, a phrase, an entire paragraph, or an image can refer to another document. 5 If an entire image is designated as a hypertext reference, the user can select the reference by placing the cursor at any position in the image and clicking a mouse button. Similarly, if an entire paragraph is designated as a 10 hypertext reference, clicking on any character in the paragraph causes the browser to follow the reference. Further details regarding hypertext can be found in D. Comer, Computer Networks and Internets (1997), which is hereby incorporated by reference.

15 A browser consists of a controller, one or more clients used to access documents, and one or more interpreters used to display documents. Each browser must contain an HTML client to retrieve Web pages and an HTML interpreter to display them. In addition, a browser can 20 include clients that permit access to services such as file transfer or electronic mail, and interpreters that display documents that use representations other than HTML.

25 To make document retrieval efficient, a browser uses caching. The browser places a copy of each document or image that a user views on the local disk. Whenever a document is needed, the browser checks that cache before requesting the document from a server on the network. Most 30 browsers allow users to control the length of time documents are kept in the cache as well as other controlling parameters.

When a browser interacts with a Web server, the two programs follow the HTTP. In principle, HTTP is straightforward: it allows a browser to request a specific item, which the server then returns. To ensure that 5 browsers and servers can interoperate unambiguously, HTTP defines the exact format of requests sent from a browser to a server as well as the format of replies that the server returns.

10 Web browsers have a more complex structure than Web servers. A server performs a straightforward task repeatedly: the server waits for a browser to open a connection and requests a specific page. The server then sends a copy of the requested item, closes the connection, 15 and waits for the next connection. A browser handles most of the details of document access and display. Consequently, a browser contains several large software components that work together to provide the illusion of a seamless service. The conceptual organization of the web 20 browser 84 of the prior art is illustrated in Fig. 6. Data paths from clients to interpreters are not shown.

Conceptually, the web browser 84 comprises a set 25 of clients, a set of interpreters, and a controller that manages them. A controller 88 forms the central piece of the web browser 84. It interprets inputs from the remote control 18, and calls other components to perform operations specified by a user. For example, when a URL is entered by the networked resource access information separator 78, the 30 controller 88 calls a client to fetch the requested document from the remote server on which it resides, and an interpreter to display the document for the user.

5            Each web browser 84 must contain an HTML interpreter 90 to display documents. Other interpreters are optional. Input to the HTML interpreter 90 consists of a document that conforms to the HTML syntax. The output of the HTML interpreter 90 consists of a formatted version of the document on the color cathode ray tube or user display 82. The HTML interpreter 90 handles layout details by translating HTML specifications into commands that are appropriate for the user's display 82. For example, if it 10 encounter a heading tag in the document, the HTML interpreter 90 changes the size of the text used to display the heading. Similarly, if it encounters a break tag, the HTML interpreter 90 begins a new line of output.

15            A more complete discussion of the Internet and computer network theory is provided in the following references hereby incorporated by reference:

1. D. Comer, The Internet (1995).
2. D. Comer, Computer Networks and Internets (1997).

20            Fig. 7 illustrates a top level block diagram showing the embodiment described above wherein the web ready television 14 or equivalent system capable of receiving audio/video signals and accessing networked resources such as the Internet receives the audio/video signal via wired 98 or wireless 100 means from the audio video signal provider 94. The television 14 then extracts and utilizes the access information provided in the transmission medium to access 25 the networked resource via cable, modem, wireless or alternative means well known in the art. This embodiment could be implemented using a personal computer 96 capable of receiving the audio/video signal and accessing networked 30 resources.

resources such as the Internet. The personal computer 96 extracts the access information from the transmission medium and uses it to access the networked resource via cable, modem, wireless or alternative means well known in the art. 5 The requested resource is then provided to the personal computer 96 or television 14 via wired 101 or wireless 103 means.

One commercially viable application of the 10 embodiments illustrated in Fig. 7 is realized within an automobile equipped with a radio receiver, display and computer capable of accessing the Internet via wireless means well known in the art. Access information linking the user to specific sites on the Internet is transmitted with 15 the audio signal or via a dedicated data channel and received by the radio. An implementation for the transmission of auxiliary information to automobile radios, is found in the Radio Data System (RDS) available in the Volvo C70 audio system, the technical specifications and 20 description of which are hereby incorporated by reference. Radio stations transmit a separate band of information that, with the RDS system, can be adapted using the concepts set forth in the present invention to permit the user to access 25 sites on the Internet. Upon receipt of the signal the computer uses links or URL's within the transmitted access information to access specific sites on the Internet. These sites are then displayed to the user either automatically or in response to user intervention and/or selection as a screen saver type of display or alternative means well known 30 in the art. A subset or other modification of the Windows® 95 operating system such as Window CE®, currently used in palmtop personal computers, could be used to control operation of the computer in the automobile, thereby

reducing the hardware and size requirements of such a computer.

5 Thus, while listening to the radio, the user  
and/or passengers in the automobile could view a number of  
sites of interest such as the following:

1. location, representative prices, hours and directions to points of interest including restaurants, historic sites, gas stations, rest stops, airports, bus terminals, lodging accommodations, etc.;
2. advertisements for stores, malls, eating establishments, concerts, etc. (i.e. "Virtual Billboards");
3. roadmaps;
4. traffic conditions and alternate routes displayed on maps; and
5. weather conditions and snow emergency routes displayed on maps.

25 The choice of sites could be linked to the content of the audio signal the user is currently tuned to, such as displaying weather maps while the user is listening to the weather on a news channel. The choice of sites could alternatively be linked to the broadcast range or area of the audio signal rather than or in addition to the content of the audio signal, such as providing a site which lists the locations and ratings of restaurants within the broadcast range of the audio signal. The access information can be transmitted with the audio signal or as a dedicated signal, which carries access information exclusively.

Fig. 8 illustrates additional embodiments of the present invention wherein the audio/video signal is provided in digital format by a networked resource or audio/video content provider. The audio/video content provider comprises, for instance, a file server which embeds links such as URL's into a streaming media digital data stream. The web browser within the personal computer 96 or the television 14 then uses the embedded links to access further sites related or unrelated to the content of the audio/video signal. The user selects a requested resource from the embedded links and the requested resource is transmitted to the personal computer 96 or television 14 via wired 101 or wireless 103 means. In these embodiments the television and/or personal computer need only be capable of access to the networked resource since the information or audio/video signal and access information flow to and from networked resources without the need for a distinct audio/video signal provider. Technologies available on the Internet, such as streaming media comprising streaming audio and/or streaming video, represent potential implementations for the audio/video signal of these embodiments.

Advances in streaming audio technology make it possible to listen to any audio recording as the sound file is delivered to the personal computer. Streaming audio differs from downloadable audio files in that you can begin to hear and work with the file before it is completely downloaded to the personal computer. A description of streaming audio technology can be found in C. Shipley and M. Fish, How the World Wide Web Works (1996), which is hereby incorporated by reference.

In each of the embodiments described above and illustrated in Figs. 7 and 8, the access information corresponding to audio/video signals transmitted through the air, free space or alternative wireless means well known in the art could be inserted within the vertical and/or horizontal blanking intervals, sidebands, or additional channels dedicated to transmission of access information for one or a plurality of broadcast channels. Such dedicated access information channels could be demultiplexed using the current channel being viewed as a selector to determine the relevant access information to extract at any given time. For audio/video signals transmitted via cable, modem or alternative hardwired means, the access information could be transmitted as additional digital information in headers and/or auxiliary data packets by means well known in the art. Additional channels dedicated to transmission of access information for one or a plurality of audio/video signals transmitted via hardwired means could also be utilized. In each of the embodiments discussed above, access to the networked resource could be made via wired means 102, such as modem, T1, and cable, or wireless means 104 by techniques well known in the art. In addition, in each of the embodiments described above the access information could be transmitted via a sub carrier channel or using spread spectrum techniques well known in the art. A description of spread spectrum technology is provided in the following references, hereby incorporated by reference:

1. R.E. Ziemer and R.L. Peterson, Digital Communications and Spread Spectrum Systems (1985).

2. M.K. Simon, J.K. Omura, R.A. Scholtz, and B.K. Levitt, Spread Spectrum Communications Handbook (1994).

CLAIMS:

1. A method for providing a link between an information signal and networked resources comprising the steps of:

5 embedding access information in a transmission medium, said access information adapted to provide access to content of a networked resource relevant to content of said information signal;

10 transmitting said information signal and said access information;

receiving said information signal and said access information at a user terminal;

extracting said access information from said transmission medium;

15 utilizing said access information to access said networked resource with an access signal; and

displaying content of said networked resource on said user terminal corresponding to said access information.

20 2. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of embedding said access information within a vertical blanking interval of said information signal.

25 3. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of embedding said access information within a horizontal blanking interval of said information signal.

4. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of embedding said access information within bandwidth not used by said information signal.

5 5. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of embedding said access information within a sideband of said information signal.

10 15 6. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of embedding said access information within a header of an internet message packet.

20 25 7. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of embedding said access information within a subcarrier in said transmission medium.

30 8. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of overlaying said access information with said information signal, said step of transmitting further comprises the step of transmitting said information signal and access information using spread

spectrum transmission techniques, and said step of receiving further comprising the step of receiving said information signal and access information using spread spectrum reception techniques.

5

9. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the steps of

10

embedding said access information within a channel comprising access information corresponding to a plurality of information signals, and

15

extracting access information from said channel corresponding to said information signal currently being received.

20

10. The method for providing a link between an information signal and networked resources of claim 1, further comprising the step of synchronizing said access information to a predetermined portion of said information signal.

25

11. The method for providing a link between an information signal and networked resources of claim 1, wherein said information signal further comprises video content.

30

12. The method for providing a link between an information signal and networked resources of claim 1, wherein said information signal further comprises audio content.

5

13. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of displaying said content of said networked resource further comprises the step of displaying said transmitted networked resource in a picture in a picture (PIP) on said user terminal.

10

14. The method for providing a link between an information signal and networked resources of claim 1, further comprising the steps of compressing said access information prior to embedding said access information in said transmission medium, and decompressing said access information by said user terminal.

20

15. The method for providing a link between an information signal and networked resources of claim 1, further comprising the steps of encoding said access information prior to embedding said access information in said transmission medium, and decoding said access information by said user terminal.

25

30

16. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of utilizing said access information further comprises the step of embedding said user information into said access signal.

17. The method for providing a link between an information signal and networked resources of claim 16,

5 further comprising the step of compressing said user information prior to embedding said access information into said access signal.

10 18. The method for providing a link between an information signal and networked resources of claim 16, further comprising the step of encrypting said user information prior to embedding said access information into said access signal.

15 19. The method for providing a link between an information signal and networked resources of claim 1, further comprising the step of embedding access information to additional networked resources in said content of said networked resource.

20 20. The method for providing a link between an information signal and networked resources of claim 1, further comprising the step of encoding said access information to additional networked resources prior to embedding said access information to additional networked resources in said content of said networked resource.

25 21. The method for providing a link between an information signal and networked resources of claim 1, further comprising the step of compressing said access information to additional networked resources prior to embedding said access information to additional networked resources in said content of said networked resource.

30 22. The method for providing a link between an information signal and networked resources of claim 1 further comprising the steps of:

assigning an index corresponding to each of a plurality of networked resources;  
selecting one of said indices corresponding to said plurality of networked resources; and  
utilizing said index to determine which of said plurality of networked resources to access.

23. The method for providing a link between an information signal and networked resources of claim 22, further comprising the step of providing a summarized content for said index, said summarized content representative of said content of said corresponding networked resource.

15 24. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of embedding a link to said networked resource in said transmission medium.

20 25. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding said access information further comprises the step of embedding a URL in said transmission medium.

25 30 26. The method for providing a link between an information signal and networked resources of claim 1, further comprising the step of recording said user information and optional temporal information by said networked resource.

27. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of displaying content further comprises the step of automatically displaying said content without 5 user intervention.

28. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of displaying content further comprises 10 the step of selectively displaying said content in response to user intervention.

29. The method for providing a link between an information signal and networked resources of claim 1, 15 wherein said user terminal is a personal computer.

30. The method for providing a link between an information signal and networked resources of claim 29, wherein said personal computer is adapted for reception of 20 television signals.

31. The method for providing a link between an information signal and networked resources of claim 29, wherein said personal computer is adapted for reception of 25 radio signals.

32. The method for providing a link between an information signal and networked resources of claim 1, wherein said user terminal is a television. 30

33. The method for providing a link between an information signal and networked resources of claim 32,

wherein said television is adapted for access to the Internet.

5       34. The method for providing a link between an information signal and networked resources of claim 32, wherein said television is adapted for reception of radio signals.

10      35. The method for providing a link between an information signal and networked resources of claim 1, wherein said user terminal is a portable personal computer adapted for wireless access to said networked resources.

15      36. The method for providing a link between an information signal and networked resources of claim 1, wherein said transmission medium is free space.

20      37. The method for providing a link between an information signal and networked resources of claim 1, wherein said transmission medium is the Internet.

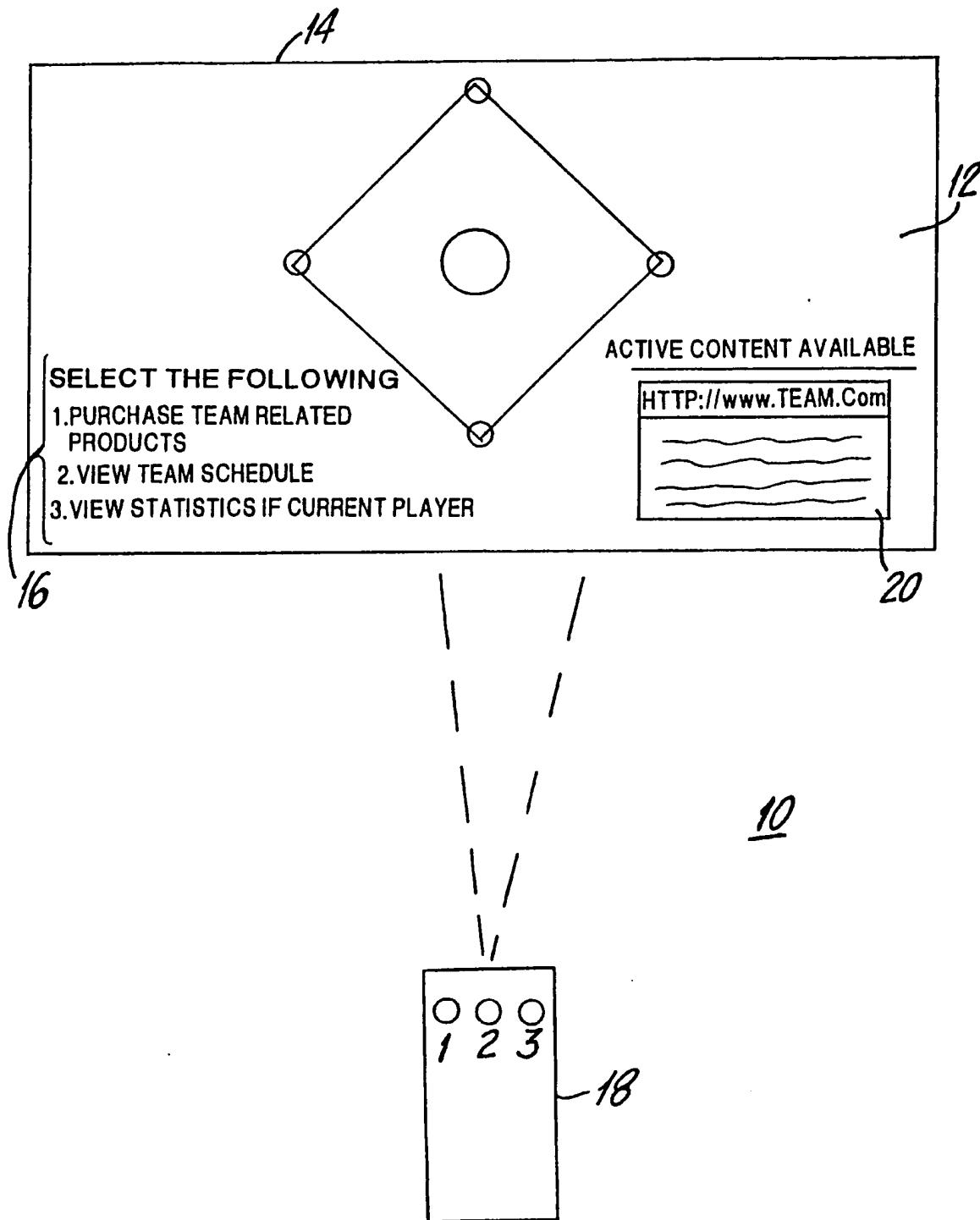
25      38. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of embedding access information further comprises the step of utilizing user information to determine access to content of the networked resource.

30      39. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of utilizing said access information further comprises the step of transmitting user information to said networked resource.

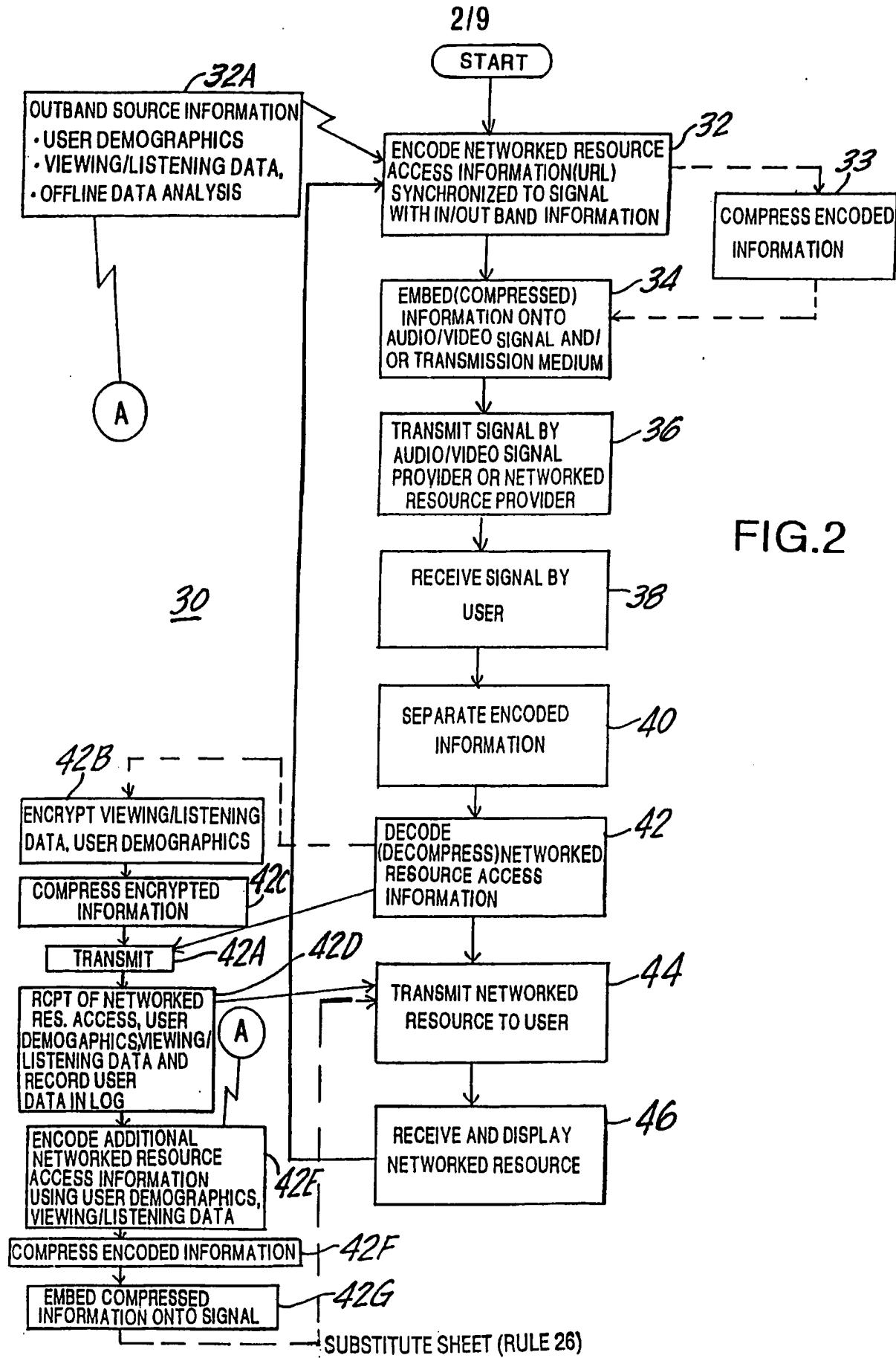
40. The method for providing a link between an information signal and networked resources of claim 1, wherein said step of displaying indicia indicating availability of said link to said content of said networked resource and displaying said transmitted networked resource to said user in response to selection of said indicia.

5

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**FIG.1**



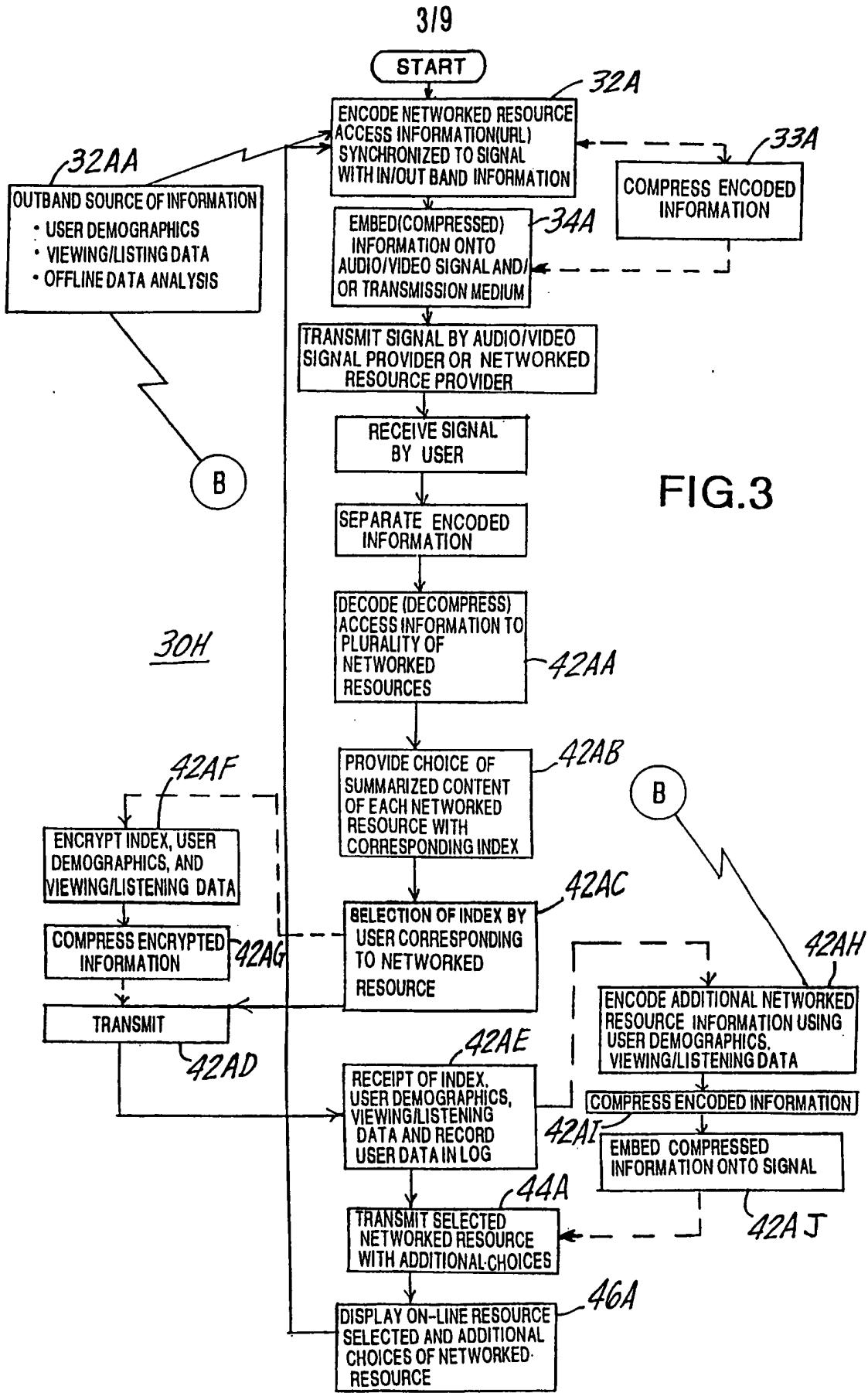


FIG.3

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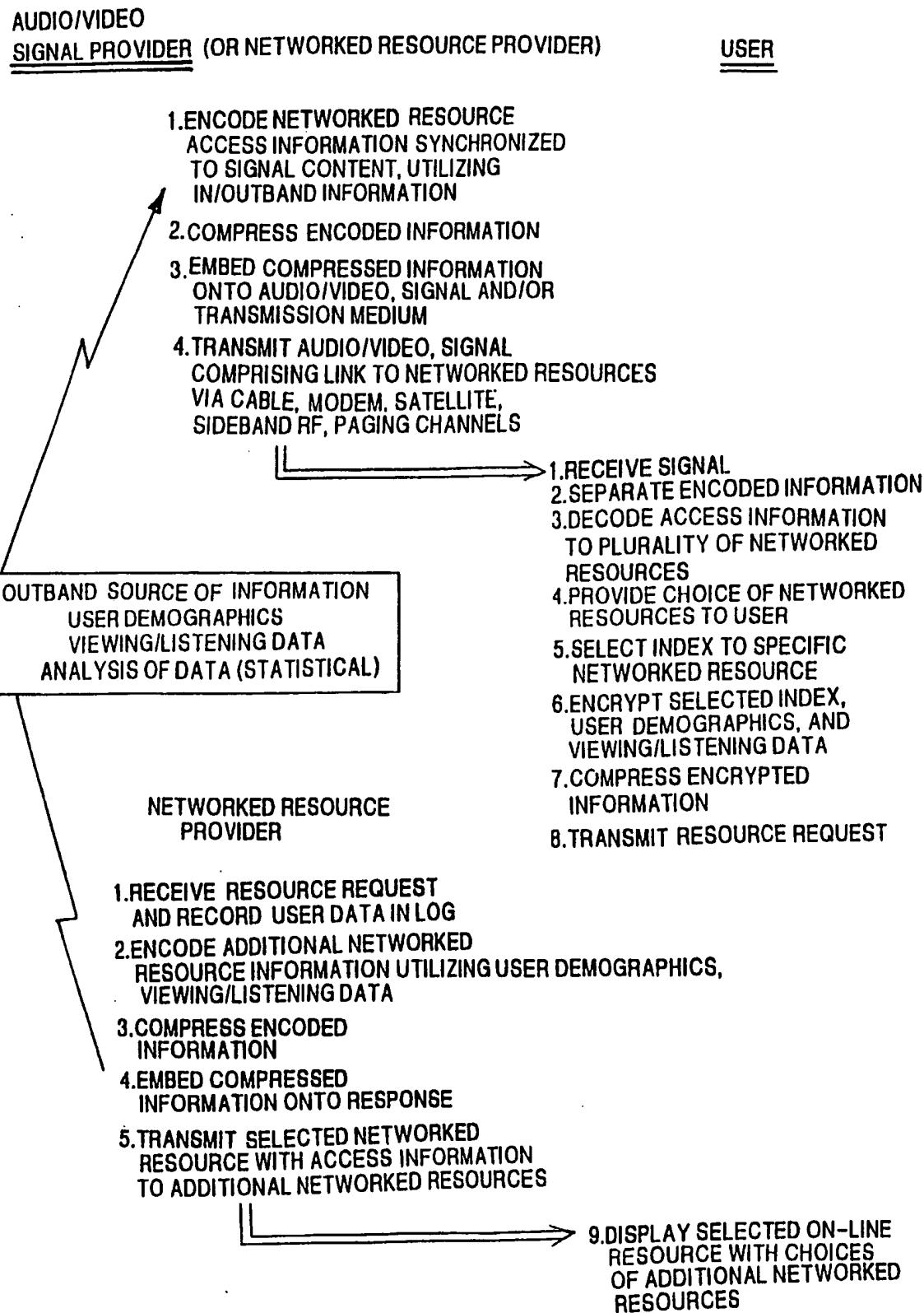
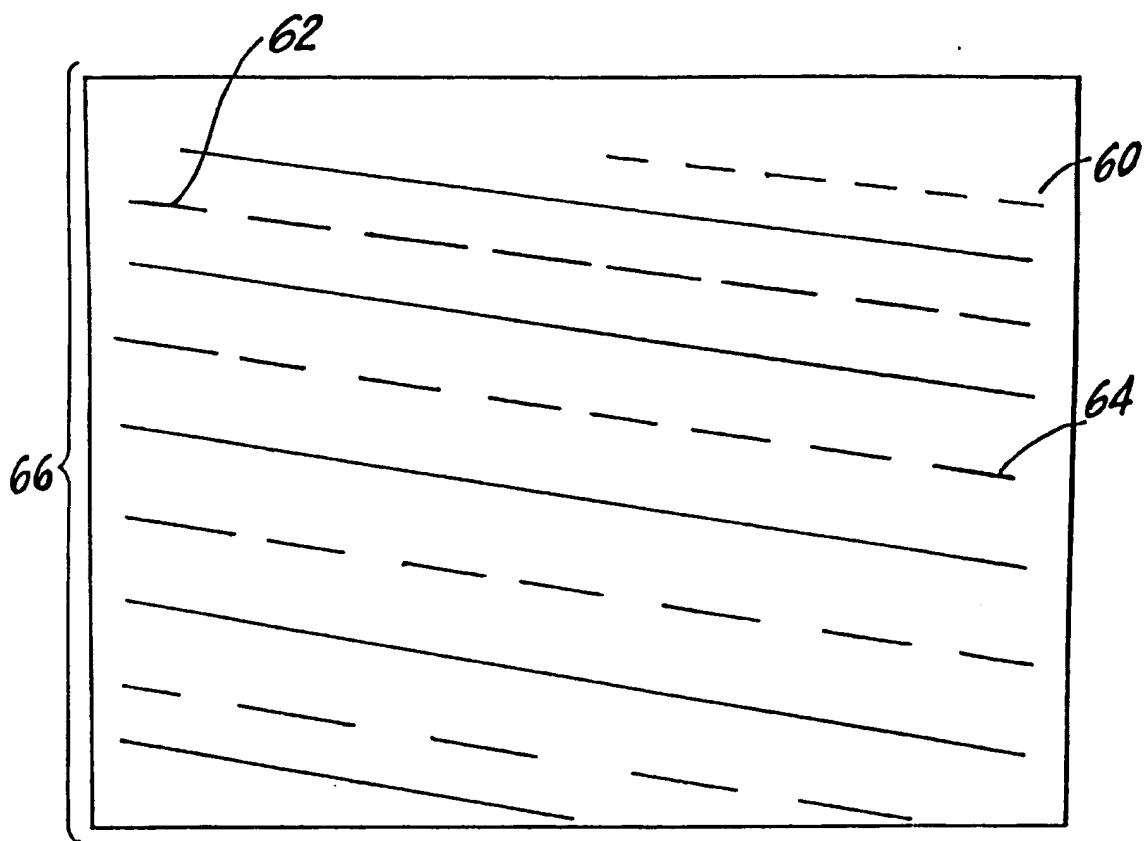


FIG.4

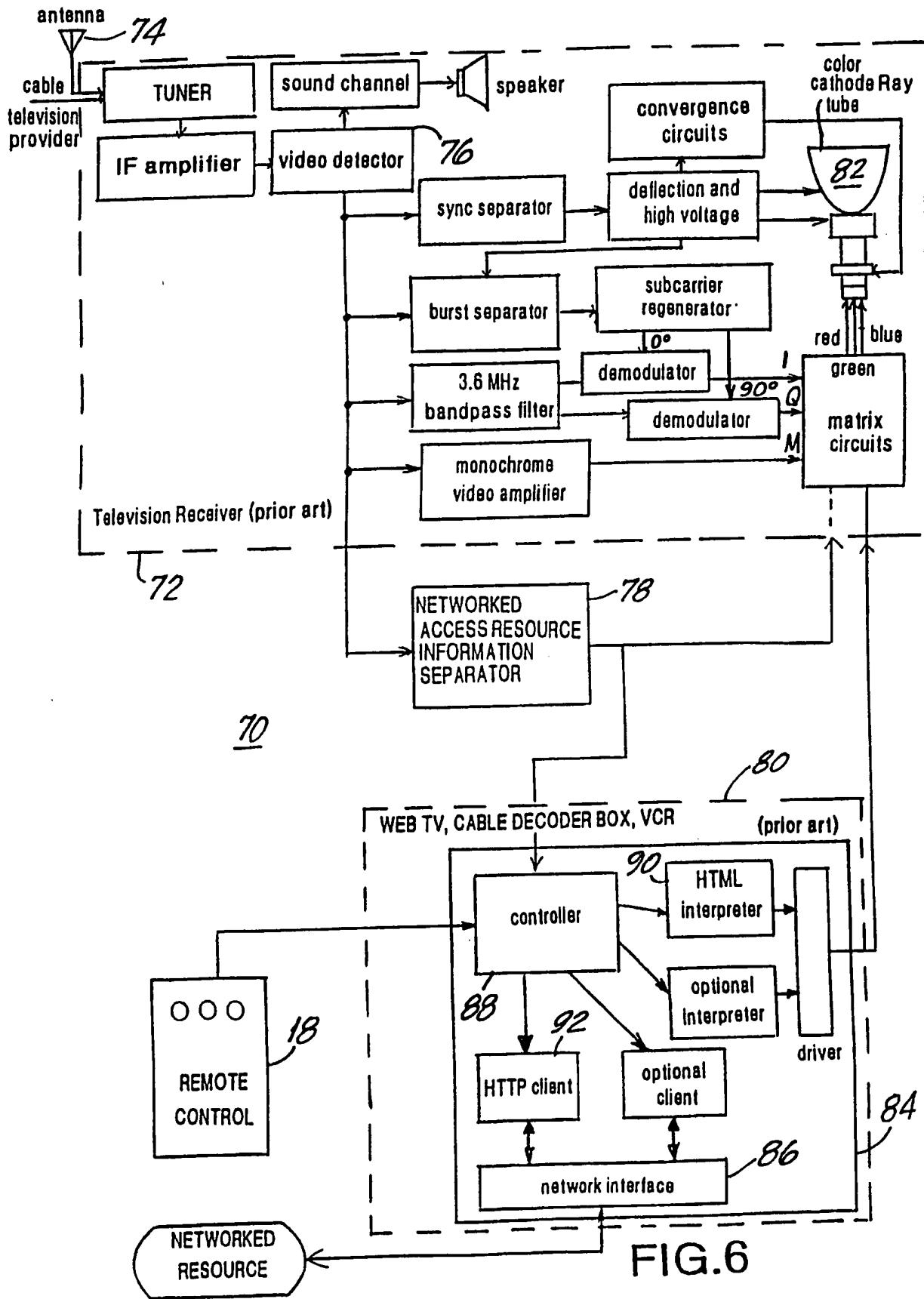
SUBSTITUTE SHEET (RULE 26)

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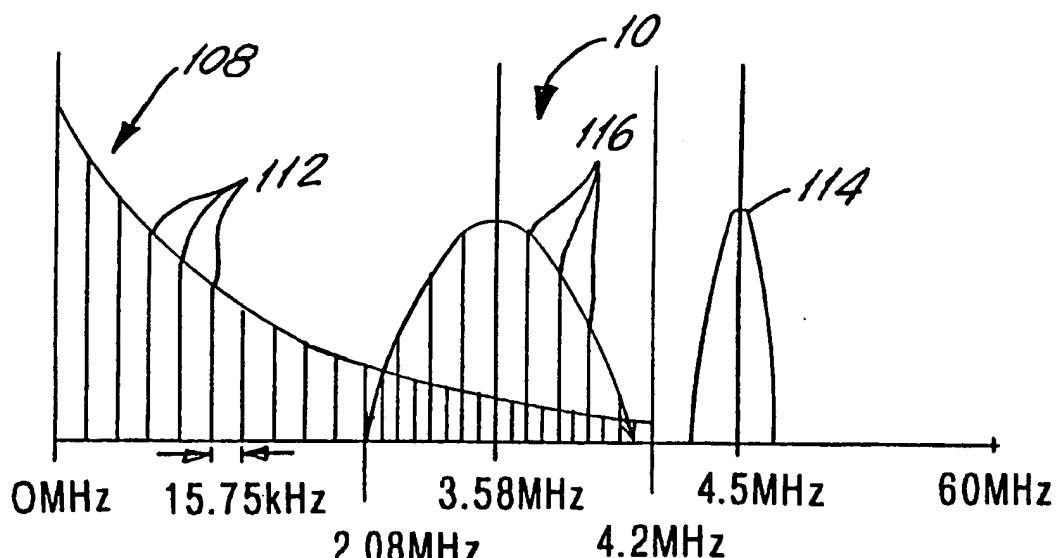


PRIOR ART  
FIG.5

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PRIOR ART  
FIG.6A

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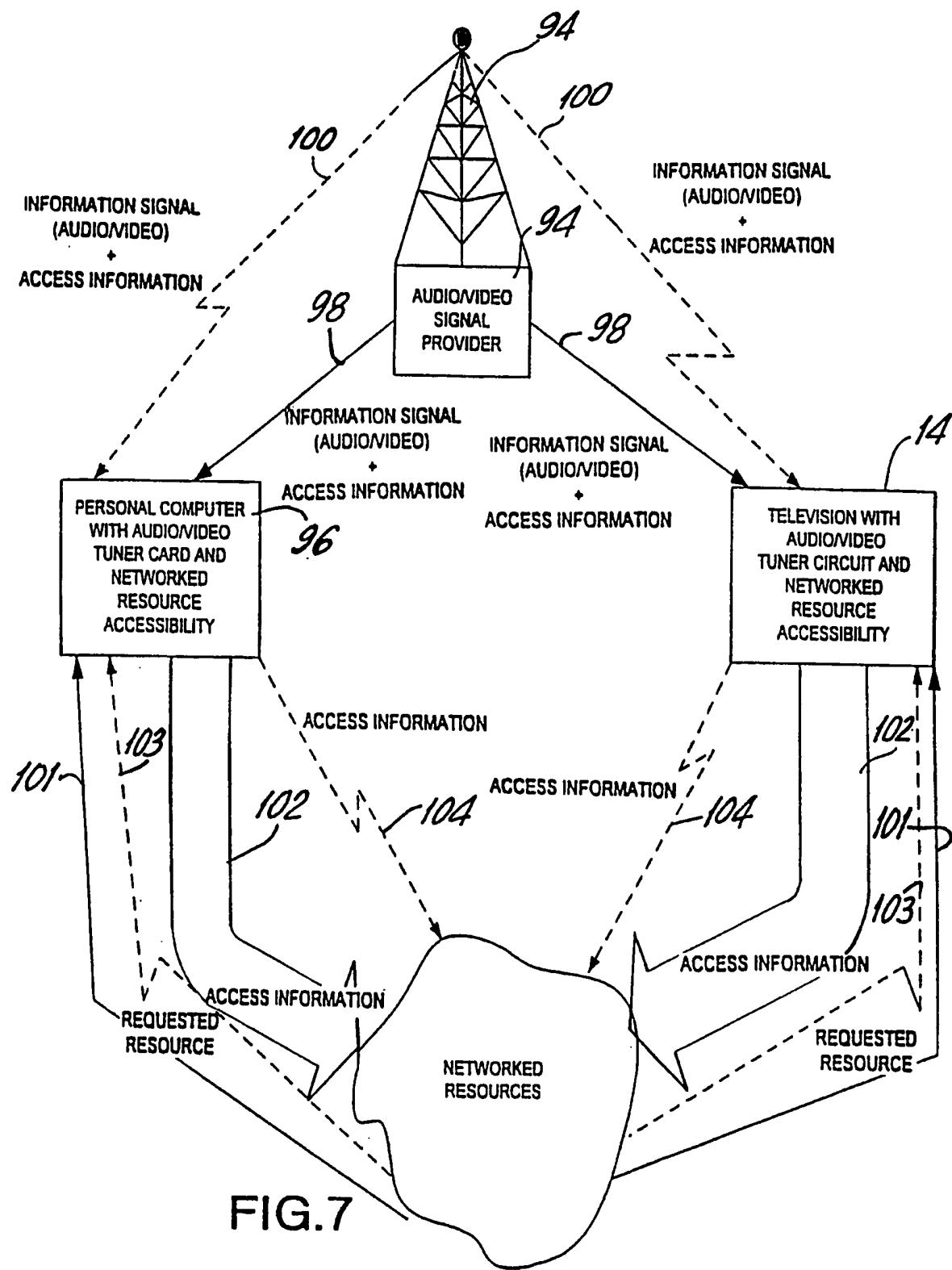
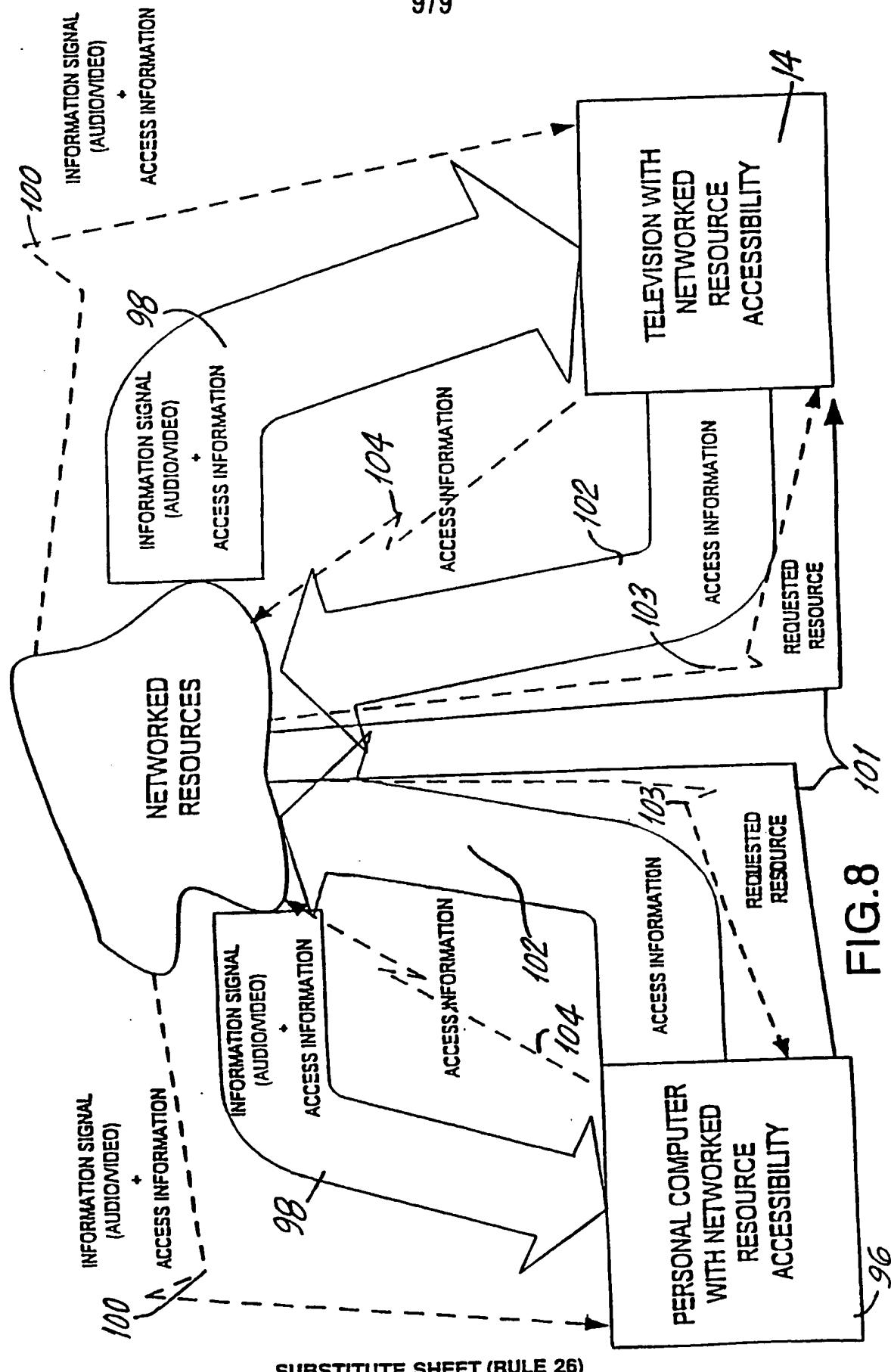


FIG. 7

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/09416

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 7/13; G06F 13/00  
US CL :345/327; 348/12, 13; 395/200.47

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 345/327; 348/6, 7, 10, 12, 13 468, 473, 474, 478, 552; 395/200.47-49

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,E	US 5,761,606 A (WOLZIEN) 02 JUNE 1998, FIGURES 1-3.	1, 2
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Y,E		3-40
X,E	US 5,774,664 A(HIDARY ET AL) 39 JUNE 1998, FIGURES 1-4.	1,2
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Y,E		3-40
X,E	US 5,774,666 A(PORTUESI) 30 JUNE 1998, FIGURES 1-5.	1, 2
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Y,E		3-40
Y,E	US 5,781,228 A(SPOSATO) 14 JULY 1998, FIGURES	1-40
X,P	US 5,694,163 A(HARRISON) 02 DECEMBER 1997, FIGURES 1-4.	1, 2
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Y,P		3040

<input type="checkbox"/>	Further documents are listed in the continuation of Box C.	<input type="checkbox"/>	See patent family annex.
"	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search  18 AUGUST 1998	Date of mailing of the international search report  15 OCT 1998
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer  NATHAN FLYNN 
Facsimile No. (703) 305-3230	Telephone No. (703) 305-9703